SCIENTIFIC PAPER

Postoperative Symptoms, After-Care, and Return to Routine Activity After Laparoscopic Cholecystectomy

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ABSTRACT

Background: Surgeons are usually not involved in the postdischarge care of patients after uncomplicated laparoscopic cholecystectomy (LC). The aim of this study was to document the symptomatic recovery of patients following LC, because this has a bearing on the planning of a postoperative care package.

Methods: Consecutive patients undergoing uncomplicated LC were followed up by a weekly telephone questionnaire survey for 6 weeks.

Results: The study cohort comprised 102 patients who all completed the study. Postoperatively, only 2.9% of the patients had postoperative nausea/vomiting lasting ≥2 days. Pain was symptomatic in 11.7% of patients. Port-site wounds were a source of significant symptoms in 70.5% of the patients. Postoperative review by a community nurse and primary-care doctor were necessary in 77.4% and 32% patients, respectively, with a combined average of 3.1 reviews per patient. Less than 4% of patients believed that they would benefit from a surgeon's review 6 weeks after LC. Median time taken to return to routine preoperative activity after surgery was 22 days (IQR, 17 to 34), which was affected by the degree of activity undertaken, wound-related symptoms persisting for ≥3 weeks, planned follow-up clinic appointment, and discharge as an outpatient.

Conclusion: Wound-related symptoms are common after LC, require substantial input from the community health service in their management, and may delay return to preoperative routine.

Key Words: Laparoscopic cholecystectomy, Postoperative symptoms, Return to work.

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INTRODUCTION

Laparoscopic cholecystectomy (LC) is one of the commonest elective laparoscopic procedures performed. In the United Kingdom, these procedures are performed widely through the National Health Service. Whilst a few years ago, patients remained in the hospital for 1 or 2 days after uncomplicated LC, increasingly this procedure is being performed on an outpatient basis. Improved primary care support and increasing financial pressures have also diminished the postoperative follow-up of these patients by the operating surgeon. In essence, the operating surgeon is no longer involved in the postdischarge care and follow-up of patients undergoing LC.

Though major complications after LC are well recognized, data about the process of patients' short-term recovery after hospital discharge, perceptions of well being, and the burden of postoperative care required in the community are not documented. Knowledge of this unobserved recovery phase is not only vital to organizing a community care package and improving service delivery and patient satisfaction, but also is very relevant feedback, which the operating surgeon misses in today's world.

We hence performed this study with an aim to follow up patients closely after uncomplicated LC to document the postoperative symptoms, assess their perceptions regarding return to preoperative routine and estimate the postoperative care they required from the community health services.

METHODS

The study was designed as a postoperative telephone questionnaire survey and was carried out prospectively between May 2007 and January 2008 in a National Health Service Hospital in England. The local audit and patient information department approved the study proposal. All eligible patients were informed about this follow-up study at the time of their discharge from the hospital and were contacted every week for 6 weeks by using a telephone survey questionnaire **(Table 1)**.

Because this was an observational study, we aimed at a target recruitment of 100 consecutive patients having

elective uncomplicated LC in a surgical clinic led by 2 consultants. LC performed as an emergency procedure following acute admission, and patients requiring conversion to an open procedure were excluded from recruitment.

In all, 112 consecutive patients having LC entered the study. Of these, 10 were excluded from analysis for various reasons detailed below **(Table 2)**, leaving a study group of 102 patients.

LC was performed using a standard 4-port technique. None of the patients received any antibiotic prophylaxis. Skin was prepared with an aqueous povidone-iodine solution. The umbilical port was made first with a 12-mm trocar by using the open technique. Further a 12-mm epigastric port and two 5-mm right upper quadrant ports were inserted under vision after pneumoperitoneum. The gallbladder was retrieved in a BERT bag. All skin wounds were closed using cyanoacrylate-based skin glue. All procedures were performed by 1 of the 2 consultants or by their trainees with consultant supervision to maintain standard practice.

Postoperative analgesia prescribed at discharge was in the form of paracetamol (1g PO up to 4 times a day as required) and codeine phosphate (30mg PO up to 3 times a day as required). Young patients who denied sensitivity to NSAIDs were also prescribed Diclofenac sodium (50mg PO up to 3 times a day) as the postdischarge analgesic. Assessment and care of wounds, within the first week, by a community nurse was requested as routine at the time of discharge.

No specific instructions were given to the patients regarding returning to routine work after the operation. Patients who asked for a "sick-leave" note at the time of discharge were routinely given a 2-week note. Patients could get further extension of their sick-leave note from their primary-care family physicians after that if required.

Forty-six patients (under the care of one consultant) were offered and attended a routine postoperative follow-up appointment in the surgical clinic 6 to 8 weeks after LC.

All patients enrolled in the study were then contacted after discharge from the hospital every week for 6 weeks by telephone and the survey questionnaire **(Table 1)** completed.

Data from the survey were analyzed, setting $P<0.05$ as significant, using GraphPad InStat version 3.06 for Win-

Table 1.
Telephone Survey

Patient Info

Age, sex, employment status, date of operation and discharge, consultant

Weekly Questions

1. Did you have any wound-related problems during this week?
2. Did you experience any nausea/vomiting during this week?
3. Was the pain satisfactorily controlled?
4. Did you need to see D/N, P/N, GP, A&E, O/P during this week?
5. Do you think you are capable of returning to your routine activity at home or work during this week? If yes…what date?
6. Have you returned to your routine activity at home or work during this week? If yes…what date?

Additional Question in the Sixth Week

1. Do you feel any need for us to see you in our clinic at this stage?

Table 2.
Exclusions from the Study

Number of Patients Excluded	Reasons for Exclusion
3	Unable to contact by phone regularly
2	Postoperative pain and rising liver function tests; requiring further investigations to exclude CBD stone
1	Postoperative readmission with gallbladder fossa abscess requiring percutaneous drainage
1	Postoperative chest infection and Clostridium difficile colitis; delayed discharge
1	Known Protein C deficiency postoperatively requiring daily low molecular heparin injection; readmission with suspected DVT
1	Recurrent urinary retention requiring urological treatment
1	Severe mental health problems, not suitable for telephone survey

dows (GraphPad Software, San Diego, CA, USA). Normally distributed data (age) were represented as means and further compared using the *t* test. The rest of the data are represented as medians and IQR and were further compared with the Mann-Whitney test, Wilcoxon matched pairs test, and Spearman's correlation test, where appropriate. Proportions were compared using Fisher's exact test.

RESULTS

The study comprised 102 patients who completed the study and whose results were analyzed. Study population demographics and hospital stay are shown in **Table 3**. Available data were analyzed under the categories of postoperative symptoms, necessary after-care, and patients' return to preoperative routine.

Table 3.
Patient Demographics, Employment Status, and Hospital Stay (N=102)

Mean age in years (range)	51.9 (19 to 82)
Male to Female ratio	14 to 88
Working	56
Retired	34
Unemployed/homemakers	12
Outpatients	16
Median inpatient stay in days (IQR)	1 (1 to 2)

Postoperative Symptoms

Postoperative nausea/vomiting and pain were not a significant problem for most patients **(Table 4)**. However, a large proportion of patients were troubled by wound-related symptoms, mainly discharge from the umbilical port-site wound **(Table 4)**.

Age, sex, and employment status had no impact on the presence of wound-related symptoms. Mean age of patients having wound-related symptoms (50.9 years) was similar to the mean age of patients without wound-related symptoms (54.4 years, P=0.3, NS). Incidence of wound-related symptoms in males (64.28%) and females (71.59%) was statistically similar (P=0.8). Wound-related symptoms were also similar in those who were employed (76.78%) and those not employed (63.04%, P=0.18, NS).

Treatment for wound-related symptoms was largely in the community with 55.5% receiving nurse-led wound care and 41.6% receiving treatment from primary-care doctors. The median number of nurse-led reviews for patients with wound-related symptoms was 4 (IQR: 2 to 8, range: 1 to 21). Antibiotics were prescribed to 37.5% (27/72) of study participants for their wound-related symptoms/conditions in the community.

After-Care and Follow-Up

In the 6-week postoperative study period, 77.4% of patients (79/102) were seen by the community nurses. The median number of reviews for patients was 1 (IQR, 1 to 3;

Table 4.
Type and Incidence of Postoperative Symptoms

Postoperative Symptom	Proportion of Patients (%)	Other Features
Nausea/Vomiting present after hospital discharge	23/102 (22.5)	Only 3/102 (2.9%) had nausea/vomiting lasting ≥2 days.
Postoperative pain not controlled by prescribed analgesia after hospital discharge	12/102 (11.7)	Pain most commonly related to wounds. 97/102 (95%) were pain free at 3 weeks after surgery.
Wound-related symptoms developing after hospital discharge	72/102 (70.5)	**Site of Wound Involved** Umbilical port site only 76% Epigastric port site only 18% Umbilicus + epigastric 3% Right lateral port-site 3% **Type of Symptom** Wound discharge 88% Wound gape + discharge 11% Wound erythema 1%

range, 0 to 21). Of these 79 patients, 40 had specific wound-related symptoms.

The primary care doctors reviewed 33/102 patients (32.3%) with a median number of reviews for patients of 1 (IQR, 0 to 1; range, 0 to 4). Of the 33 patients seen by community doctors, 30 were seen for wound-related symptoms, 2 for postoperative pain, and 1 for skin numbness.

The routine surgical outpatient clinic appointment was offered to and attended by 46/102 patients about 6 to 8 weeks after the operation. Only 2 of these 46 patients felt that it was necessary to have such a routine appointment. Two other patients from the remaining 56 patients also felt that they would have benefited from a routine postoperative follow-up at 6 weeks in the surgical clinic. Overall, only 4/102 (3.9%) patients thought that it would be of some benefit to have such a routine postoperative outpatient appointment.

Return to Routine Activity at Home or Work After Surgery

In our questionnaire, we asked patients when they actually returned to work or routine activity at home (if not working) and also when they felt capable of returning to work or routine activity at home. Median time to perceived capability of returning to preoperative routine was 15 days (IQR, 11 to 21). This was significantly earlier than median time to actual return to preoperative routine work/activity, which was 22 days (IQR, 17 to 34) ($P<0.0001$).

Being employed, having wound-related symptoms persist for ≥3weeks, and having a postoperative routine surgical clinic appointment delayed return to routine activity, while being discharged on the day of the operation had the opposite effect. In contrast, age of the patient, sex of the patient, presence or absence of wound-related symptoms, and antibiotic treatment in the community did Mnot have any impact on the time taken to return to preoperative routine activity or work **(Table 5)**.

DISCUSSION

The aim of our study was to document the unobserved phase of recovery after LC, focusing on patients' symptoms, because they have a direct impact on the patients' recovery and well-being.

Surgical-site symptom rate after LC has not been evaluated before. On the other hand, surgical-site infection rate after LC is well established at <2% based on large trials with

Table 5.
Factors Affecting Time Taken to Return to Work or Routine Activity

Factors	Median Time to Returning to Preoperative Routine Activity or Work (Days)	Significance (P)
Being employed/working	24.5	0.0051
Not employed/working	20.5	
Wound-related symptoms persist for ≥3 weeks	27.5	0.021
Wound-related symptoms persist for ≤2 weeks	21	
Patients offered routine outpatients follow-up at 6 weeks	27	0.0136
Patients not offered routine outpatients follow-up at 6 weeks	20	
Patients discharged as outpatients	18	0.0331
Patients discharged after inpatient stay	23	
Wound-related symptoms present	23	0.085, NS
Wound-related symptoms absent	19.5	
Patients receiving antibiotics in the community	23	0.445, NS
Patients not receiving antibiotics in the community	22	
Male patients	19	0.081, NS
Female patients	23	
Age ≤53 years (53=Median of the group)	21	0.073, NS
*Age >53 years	24	

postdischarge follow-ups.[1,2] Over 70% of our patients experienced wound-related symptoms. The predominant symptom was discharge, typically from the umbilicus **(Table 4)**. Though it is easy to believe that some discharge from operative wounds is physiological, this symptom was disturbing enough to most patients, to merit repeated reviews by the community nurse or doctor. Although the principal treatment for such wound-related symptoms in the community was nurse-led wound care, 37.5% of the patients with wound-related symptoms received antibiotics in the community.

We did not use routine antibiotic prophylaxis in our cases, and there is evidence to suggest that perioperative antibiotic prophylaxis does not alter wound infection rates after LC.[3,4] We used cyanoacrylate-based skin glue for closure. Multiple trials have shown that skin closure with such tissue adhesive results in no higher adverse wound outcomes compared with traditional subcuticular skin closure.[5–7]

Two other studies[8,9] have demonstrated a higher umbilical wound complication rate compared with other port sites, especially after LC. Native umbilical bacterial flora and contamination during gallbladder extraction have been implicated. Our study once again has confirmed that a large majority of patients will have discharge from umbilical port-site wounds after uncomplicated LC.

Interestingly, 37.5% of the patients with wound-related symptoms (26.4% of the study group) were prescribed therapeutic antibiotics for their wound problems by community doctors. Whether these represented true wound infections is debatable, because no objective data are available, and most patients received empirical antibiotics in the community. Postoperative wound management in the community is known to be pragmatic. A large United Kingdom study, involving follow-up of over 5500 patients after caesarean deliveries showed that almost all women with wound problems were treated with antibiotics, regardless of how minor the problem, with 97% being prescribed in the community.[10]

Two other consequences of the high wound-related symptom rate were seen in our study. Firstly, it burdened the community service with post-LC after-care. Our study shows a combined doctor or nurse average review rate of 3.1 per patient. Secondly, wound-related symptoms that persisted for 3 or more weeks significantly delayed return to work or preoperative routine activity. This suggests the need for techniques to reduce wound-related symptoms if possible or at least to have an organized community care package for these patients to ensure that their wounds are looked after efficiently, economically, and without the use of inappropriate antibiotics.

Routine outpatient follow-up by the operating surgeon after LC has diminished over the years. Our study has demonstrated that not only did most patients find such routine clinic appointments unnecessary but also such an arrangement delayed their return to work. We appreciate that patients were not randomized to assess their perception about outpatient clinic follow-up, but the result is overwhelming against clinic follow-up.

The final aspect of our study was to assess when patients really got back to their preoperative state. Assessing return to the preoperative state of well-being after an operation is not easy, more so when the study population is heterogeneous in terms of age, fitness, and comorbidity. Return to preoperative state of well-being is distinct from being able to return to a preoperative state of physical activity or exercise capacity. For this, we used return to work or routine preoperative activity in those who did not work as an indirect marker. When questioning patients who did not work, we ensured that they understood that returning to preoperative activity level meant going back to social, sporting, shopping, household, and child-care related activity, which they performed before the operation and not just returning to full physical mobility. The time taken to return to work or routine activity in this study was comparable to that in a Scottish study,[11] which specifically assessed this. This in comparison is a lot longer than time taken to return to preoperative physiological exercise capacity.[12,13]

Return to work or preoperative routine was hastened by discharge as an outpatient. This effect can be explained by the fact that patients who get discharged as outpatients are often fitter, younger individuals and have had an undemanding operation. However, it should be noted that our unit started performing some LCs as outpatient cases during the time of this prospective study. This means that several patients who would fulfil the criteria for outpatient discharge were treated as inpatients with at least a 1-day hospital stay. Though our results favor outpatient LC for early return to work, it should be noted that our study was not designed to look at this effect. A recent Cochrane review[14] suggested that there was no difference in return to normal activity and work in patients discharged as outpatients or overnight stay after LC.

Interestingly, we found that patients who were employed took longer to get to work compared with the time taken to get back to their preoperative routine activity by pa-

tients who were homemakers, retired, or unemployed. Whilst this probably reflects the fact that employed patients did harder work and took longer to return to it, it may also suggest that patients who were at home, returned to their household work earlier because they had no option to stay on paid sick leave.

This study also shows that patients feel ready to return to work or routine preoperative activity significantly earlier than when they actually resume work or preoperative routine (15 days versus 22 days, $P<0.0001$). Previous studies have shown that standardized encouragement can accelerate physiological recovery.[12] We suggest that adequate support and encouragement along with appropriate wound care through a planned postoperative community care pathway may facilitate earlier return to work.

CONCLUSION

Wound-related symptoms are common after uncomplicated LC, and patients should be counseled. They add a significant burden on the community health service and if prolonged can delay return to work. Routine surgical outpatient follow-up is not necessary. A well-organized community care package is necessary for most patients after discharge following LC.

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